REMARKS

Claims 1-6, 8-27 and 29 remain in this application. Claims 1, 9, 19 and 24 have been amended.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 1-6, 8-27 and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,275,907 to Baumgartner et al. ("Baumgartner") in view of U.S Patent No. 5,895,484 to Arimilli.

In an embodiment of the present invention, a requesting node issues a read request for data from another node. A coherence agent receives the read request and issues a speculative read request to a home node (e.g. the node that stores the requested data; see para. 0036). After sending the speculative read request (or potential prior to), the coherence agent begins a cache coherence protocol. For example, as stated in para. 0044, the cache coherence agent may check a snoop filter table to determine the caching status of the memory location. Thus, the speculative read request is performed before the results of the cache coherence protocol are determined. The read request is "speculative" in that it is being performed ahead of determining whether the read request is actually needed. In embodiments of the present invention, "confirm" and "cancel" commands can be issued to complete the read request or terminate it.

Claim 1, for example, recites the use of a coherence agent to issue a speculative read request that can be processed prior to the results of a coherency protocol are determined. In particular, claim 1 recites "issuing a speculative memory read request

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from a coherence agent in response to said memory read request from the requesting

node"; and "receiving the speculative memory read request at a home node before results

of a cache coherence protocol are received at the home node." Similar features are found

in independent claims 9, 19 and 24. Such features are neither taught nor suggested by the

Baumgartner or Arimilli references.

In Baumgartner, as described at Col. 9, lines 12-47, the processor core 12 (Fig. 1)

of a reserving processor 10 requests a cache line and if there is a cache miss in its local

cache hierarchy 14, then the cache request is sent out on the local interconnect 16. All

snoopers coupled to the local interconnect 16 issue a coherency response to the request

transaction. The node controller 20 is to send a response as well. A transaction send unit

(TSU) 42 refers to a coherence directory 50 to determine if the requested cache line is

checked out to a remote processing node 8 in modified state. If it is then TSU 42 replies

to the request of the reserving processor 12 with a coherency response (AResp ReRun)

and then issues a request for the cache line from remote processing node 8 (via

interconnect 22). When the requested cache line arrives it is kept at node controller 20

and awaits the reissue of the cache line request by the reserving processor 10 (lines 34-

38). As can be seen in Baumgartner, the TSU checks the coherence directory to

determine the cache protocol results, and in response to that issues a read request to the

remote processing node. In other words all of the nodes complete their cache coherency

protocol results before the read request is sent to the remote processing node. There is

nothing "speculative" about the read request, such a request is absolutely necessary as

indicated by the coherence directory. Such cache coherency protocol determinations take

time. The presently claimed invention may reduce the amount of time it takes to retrieve

data by issuing the read request speculatively before knowing the protocol

determinations. If it turns out that the protocol determinations require the data to be read

from the remote node, that process was previously initiated and may result in time

savings (see, e.g., para. 0015).

In view of the above, the statement in the Office Action that "the speculative

memory read request [is received] at a home node before results of a cache coherence

protocol (MESI) are determined" is in error. The Office Action further states that

Baumgartner "does not particularly teach completing said memory read request before

results of the cache coherence protocol are determined." The rejection of the claims

relies on Arimilli for this feature.

The Office Action relies on the text between Col. 5, line 66 and Col. 6, line 3,

which is reproduced below:

The present invention has obvious performance advantages over the prior art
because the delay between a read/RWITM request on the system bus and the sampling of
the combined response can be several system bus clock cycles. Hence, by allowing the
requested data to be read from the L2 cache of the intervening processing unit before the
combined coherency response is received, the intervention latency is reduced
tremendously and the overall SMP system performance is significantly improved.

First, as detailed above, Baumgartner fails to teach or suggest the use of a

speculative read request and specifically teaches away from the use of such a read

request. Next, in Arimilli, a read request is snooped from the bus by all processing units

coupled to the bus. Each processing unit prepares a coherency response for the snooped

request. The processing unit that issues an intervention coherency response, then

proceeds to buffer data for the read request. Looking at Col. 4, lines 6-23, each

processing unit performs its coherency protocol as it accesses the data (if present). Note

that the Modified, Shared, or Exclusive status affects whether the data is to be presented

onto the bus. Thus, Arimilli specifically teaches that the coherency protocol is to be completed with the accessing of the data. Independent claims 1, 19 and 24 have been amended to bring out the feature (e.g., as described in para. 0038) that the read request is initiated at the home node before receiving the coherency protocol results. Independent claim 9 refers to "initiating the cache coherence protocol after initiating the read to memory at said home node." Since features of the claims are neither taught nor suggested by the Baumgartner or Arimilli references, reconsideration and withdrawal of the rejection of claims 1-6, 8-27 and 29 under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

For all the above reasons, the Applicant respectfully submit that this application is now in condition for allowance. A Notice of Allowance is earnestly solicited.

The Examiner is invited to contact the undersigned at (202) 220-4255 to discuss any matter concerning this application. The Office is hereby authorized to charge any additional fees or credit any overpayments under 37 C.F.R. § 1.16 or § 1.17 to Deposit Account No. 11-0600.

Respectfully submitted,
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Dated: December 28, 2006   By: _____

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